

WHAT IS CLAIMED IS:

1. A semiconductor device manufacturing method comprising:

forming a wiring layer; and

5 forming a first insulating film on the wiring layer under a condition that hydrogen in a plasma is not more than 1% in all gas components.

2. The method according to claim 1, further comprising forming a gate insulating film having a film
10 thickness of not more than 80Å.

3. The method according to claim 1, wherein the first insulating film is formed by spin coating.

4. The method according to claim 1, wherein the first insulating film is formed by sputtering.

15 5. The method according to claim 1, wherein the first insulating film is formed by thermal CVD.

6. The method according to claim 1, further comprising forming a second insulating film on the first insulating film under the condition that hydrogen
20 in a plasma is not more than 1% in all gas components.

7. The method according to claim 6, wherein the first and second insulating films are respectively formed by any of spin coating, sputtering, and thermal CVD.

25 8. The method according to claim 4, wherein the first insulating film is formed at not more than 450°C.

9. The method according to claim 5, wherein the

first insulating film is formed at not more than 450°C.

10. The method according to claim 7, wherein the first and second insulating films are formed at not more than 450°C in use of thermal CVD or sputtering.

5 11. The method according to claim 1, further comprising:

forming a second insulating film on the first insulating film under the condition that hydrogen in a plasma is not more than 1% in all gas components;

10 planarizing the second insulating film until part of an upper surface of the first insulating film is exposed;

forming a third insulating film on the part of the upper surface of the first insulating film and the
15 second insulating film under the condition that hydrogen in a plasma is not more than 1% in all gas components; and

forming a contact which is connected to the wiring layer through the first and third insulating films.

20 12. The method according to claim 11, wherein the second insulating film is formed by spin coating or thermal CVD.

13. A semiconductor device comprising:

a wiring layer; and

25 a first insulating film which is formed on the wiring layer under a condition that hydrogen in a plasma is not more than 1% in all gas components.

14. The device according to claim 13, further comprising a gate insulating film having a film thickness of not more than 80Å.

5 15. The device according to claim 13, wherein the first insulating film includes a low dielectric constant film.

16. The device according to claim 15, wherein the low dielectric constant film includes an SOG film.

10 17. The device according to claim 13, wherein the first insulating film includes a sputtered SiO₂ film.

18. The device according to claim 13, wherein the first insulating film includes a thermal CVD film.

19. The device according to claim 18, wherein the thermal CVD film includes an HCD-SiN film.

15 20. The device according to claim 13, further comprising a second insulating film formed on the first insulating film under the condition that hydrogen in a plasma is not more than 1% in all gas components.

20 21. The device according to claim 20, wherein the first and second insulating films include any of a low dielectric constant film, a sputtered SiO₂ film, and a thermal CVD film.

22. The device according to claim 13, further comprising:

25 a second insulating film which is formed in a selective region on the first insulating film under the condition that hydrogen in a plasma is not more than 1%

in all gas components;

a third insulating film which is formed on the first and second insulating films under the condition that hydrogen in a plasma is not more than 1% in all gas components; and

a contact which is connected to the wiring layer through the first and third insulating films and does not contact the second insulating film.

23. The device according to claim 22, wherein the second insulating film includes an SOG film or a thermal oxide film.

24. The device according to claim 13, wherein the first insulating film includes a film containing no hydrogen.

25. The device according to claim 13, wherein the semiconductor device includes a nonvolatile memory.

26. The device according to claim 13, wherein the semiconductor device includes a ferromagnetic memory or a magnetic random access memory.